

Recovery of Stream Habitats at Managed Grazing Sites in the West Walker River Watershed, Mono County, CA

Livestock grazing, irrigation and human recreation in stream and wetland areas caused damage to stream banks and impacts to water quality in the upper West Walker River watershed in Mono County, California. By changing grazing practices, building fences, planting trees, and altering irrigation structures improvements to stream banks and stream habitat were measured within three years.

Just north of Yosemite National Park, the West Walker River meanders through the Sierra Nevada in northeast California. It is a premier fishing and recreation destination in Mono County and is designated as one of the state's few Wild and Scenic Rivers. In this watershed, livestock grazing and, to a lesser degree, human recreation and irrigation caused erosion, damage to stream environments, and impacts to water quality. Studies of livestock overgrazing show that ecological impacts often include unstable eroded stream banks, loss of streamside plants, changes in stream channel and stream bottom conditions, sediment releases, loss of habitat, increases in algae, higher water temperatures, and damage to the stream



At start of Project at One of Medium Stream Sites (1999)

food web (Belsky *et al* 1999; Herbst and Knapp 1999).

To help address degradation in this watershed, new management practices were established ranging from complete livestock removal to rest-rotation and seasonal grazing. Many of these new management practices were included in the Junction Allotment Management Plan (AMP) developed by the U.S. Forest Service (USFS). The AMP was revised in 1994 for grazing activities on approximately 3,000 acres of national forest, state and private lands in the watershed. Through a partnership with



Three years after management measures were in place (2002)

private ranchers, the CA Department of Fish and Game (CDGF), the Lahontan Regional Water Quality Control Board, UC Santa Cruz and USFS over four miles of exclusion fencing was built, several hundred black cottonwood tree cuttings were planted, and changes to irrigation diversions were completed. Monitoring at managed and controlled sites at small, medium and large streams in the watershed was completed to establish baseline conditions. Stream size was

determined by both width and flow (e.g., a small stream has a width of less than 2.5 meters and a flow of less than 10 cfs.) Monitoring was continued over a three-year period to evaluate success of the new management practices. To supplement these efforts, the CDFG worked with local elementary, middle and high school students in an interactive watershed education program that included basic watershed science and methods to assess watershed health.

These management, monitoring, and education activities started in 1998. Construction of fencing, alterations to irrigation structures, plantings, baseline and initial evaluation monitoring were completed by 2002. As resources allow, additional evaluation monitoring, education, and implementation of the AMP will be ongoing.



Exclusion Fencing Installed at the Project Site

Most managed sites showed a trend toward recovery based on habitat parameters. Monitoring at small, medium and large stream sites over three years showed that riparian cover (streamside vegetation) at most managed sites increased compared to the control sites.

Riparian cover shades the stream, lowers water temperature and provides habitat. Stream bank stability also increased at most managed sites, resulting in less damaging soil erosion. However, stream biota (aquatic insects and other invertebrates) did not show recovery at the managed sites over the three-year monitoring period. These results indicate that vegetation and instream physical habitat are better indicators for short-term (i.e., 3-year) monitoring of rangeland management practices. Long-term monitoring may well be needed to show improvements in stream biota where rangeland management practices are installed.

Many of the planted cottonwoods survived the first year but eventually died due to lack of water and browsing by deer or stray cattle. However, photo point monitoring showed that willows were established naturally and abundantly within the fenced areas.

Overall, the monitoring suggests that medium-to-large size streams may be more resilient to the long-term effects of livestock grazing, but once degraded, the larger streams take longer to recover. In contrast, small streams appear more susceptible to grazing impacts, but seem to recover faster when grazing pressure is reduced or removed.

Through a partnership of private ranchers, the CA Department of Fish and Game (CDGF), the CA Regional Water Quality Control Board, UC Santa Cruz and USFS livestock grazing management measures were implemented and monitored for three years. An interactive watershed education program was established for local elementary, middle and high school students. A Clean Water Act Section 319h grant in the amount of \$96,890 funded these efforts. CDGF and private ranchers provided a grant match of \$64,603. Additional monies for monitoring in the

amount of \$65,000 were from the state Surface Water Ambient Monitoring Program (SWAMP) and the federal Wetlands Protection Program (Clean Water Act Section 104b.)

References

Belsky, A.J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. *Journal of Soil and Water Conservation* 54:419-431

Herbst, D.B. and R.A. Knapp. 1999. *Evaluation of Rangeland Stream Habitat Condition Using Biological Assessment of Aquatic Communities to Monitor Livestock grazing Effects on Streams in the Eastern Sierra Nevada*. Final Technical Report submitted to the U.S. EPA; Contact Officer Clyde Bishop. 23 November.

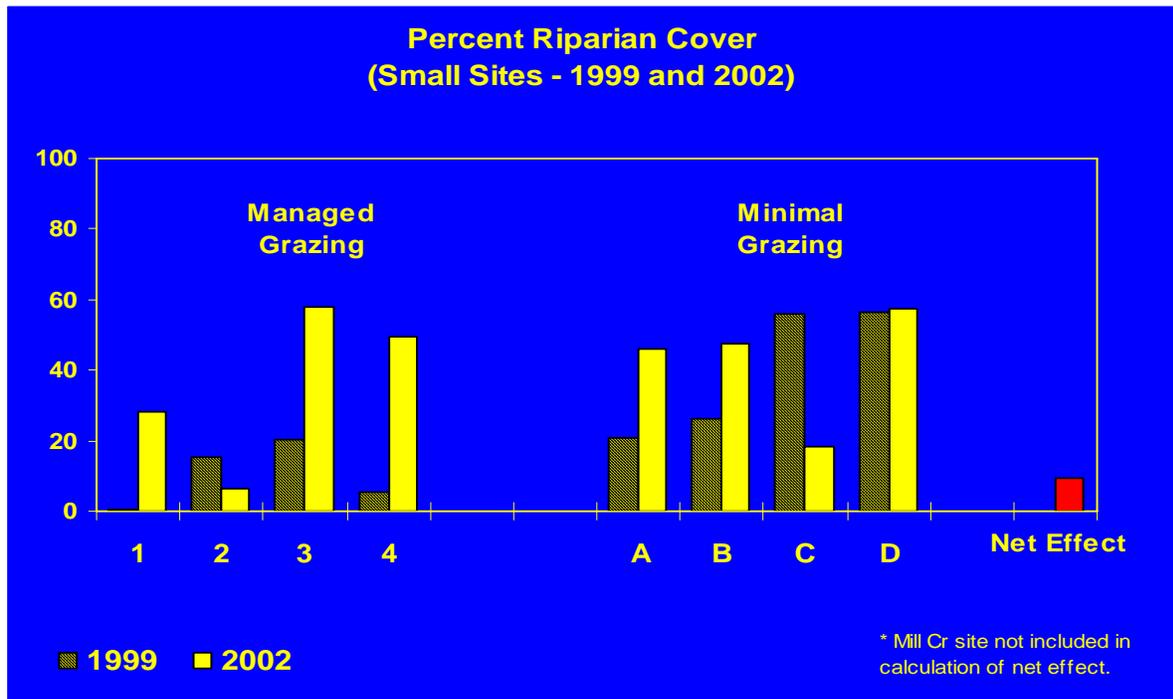
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Graph shows increases in riparian cover at small stream sites with grazing management practices in place.

